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LETTERS,

TO THE

AGRICULTURE SOCIETY, at MANCHESTER.

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AGRICULTURE SOCIETY,

AT

MANCHESTER,

ON THE

CAUSE of the CURLED DISEASE in POTATOES.

PRINTED in the YEAR 1778.

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PREFACE.

Manchester, Dec. 28, 1778.

THE *AGRICULTURE SOCIETY at* MANCHESTER, *amongſt their Premiums for* 1778, *offered a* **SILVER CUP**, *value eight guineas,* "*to the perſon who ſhould diſcover, by actual experiment, the moſt* probable *cauſe of the* curled diſeaſe *in Potatoes*."

This diſeaſe, which hath made its appearance amongſt us for a few years only, has ſpread with ſuch alarming increaſe, that it merits the moſt attentive and perſevering inveſtigation. The following are ſome of the principal papers ſent to the Society on this ſubject: They may probably lead to ſome uſeful diſcoveries, as they point out various ſuppoſed *cauſes of this defect, and ſuggeſt a variety of important experiments. But until theſe have been made by many different people, and under a great variety of circumſtances, as to ſoil, ſituation, ſeed,* &c. *and the accurate accounts of ſuch experiments have been tranſmitted to the Society, they cannot preſume to give any deciſive opinion on the ſubject, by adjudging the premium to any of the candidates. They, however, think themſelves obliged for the numerous communications ſent them on this ſubject, and hope the authors of them will perſevere in their truly laudable reſearches and experiments.*

The papers are marked numerically, as it is judged proper to conceal from the public, at preſent, the names of their authors.

It was once intended to have abridged theſe papers, and only to have publiſhed the heads of them: But it was found ſo difficult to do this with accuracy, and juſtice to the authors, that it is judged better to give them in their original form to the public, who will make all due and candid allowance for inaccuracies and defects of ſtile, in papers which were not originally deſigned for the preſs.

LETTERS, &c.

LETTER I.

To Mr. Partington, *Secretary to the Agriculture Society*, Mancheſter.

SIR,

OBSERVING the advertiſement that was put out by your ſociety, in regard to the curled diſeaſe in potatoes, as in claſs the fifth, I take this opportunity to let you know, that for this three or four years I have been as attentive as poſſible to find out the above diſorder; and through the many experiments that I have tried, I can make it evidently appear what will make them curl, and what will, with care, in a manner prevent them; which I hope will anſwer the deſired end.

The firſt reaſon I ſhall mention is, that the neweſt kinds, ſuch as have been raiſed within this nine or ten years, are moſt apt to curl, by reaſon they will not ſtand to be kept in winter and ſpring before ſetting, as the old kinds will; for certain it is, that the inſect is got either by froſt, or bad keeping before ſetting, for I am of opinion that either is exceeding hurtful, in regard to making them curl; for in one experiment that I made, I took an equal quantity of fine potatoes (what we call Manleys) out of the hog; one part I kept moiſt and cool, which made them full of virtue and firm, that when they came to be ſet there was moiſture to diſſolve the ſet and feed the branch, and not one curled amongſt them.

The other part I kept dry and free from wet, till they were wrinkled and became ſoſt, and the moiſture almoſt expended, ſo that when they were ſet, inſtead of putriſying and decaying, and leaving the plant to the ground, as all manner of ſeed ſhould do, the ſet itſelf received nouriſhment from the ground, and became ſolid and harder than ever, and all in a manner curled.

This is always the caſe with curled potatoes, that the ſet does not putrify as naturally it ſhould, or elſe leaves a little hard ſubſtance at the end of the root, that hinders it from taking proper hold of the ground, though they will mend as they grow older.

Another experiment that I had was in autumn, 1776, when I got up a bed of potatoes to lay by in winter. I did not get them clean, but leſt plentiſul in the ground, and as regular as poſſible, in order to try this fancy: So before the ſeverity of winter came on, I took ſtraw and peas-holm, and covered one part of the above bed very well; the other part of the bed was not covered at all, but remained in this ſtate all winter, and in ſpring following I took off the ſtraw, and cleaned the bed from weed, to ſee what the fruit of this crop would be; where that part of the bed that was covered was quite free from curled ones, but the other part of the bed that was not covered produced a great many curled, particularly thoſe that lay ebbeſt; which is clear to me, that it was owing to froſt and ſeverity of the weather.

Now it has long been experienced, that plants of all kinds appearing blaſted or withered, ſhrubby and curled, are the effect of immoderate wet or heat, and cold with froſt interchangeably; therefore I will not ſay but after the potatoes are ſet, this may add to the defect; but it is poſſible to remove this obſtruction, as well as the former. I have tried many other ſchemes, which are too numerous and tedious to mention here; ſuch as two branches coming from one potatoe, the one ſhall be curled and the other quite free, which I believe I can demonſtrate clearly.

Therefore if you and the other gentlemen in your ſociety, ſhall think proper of my attendance at your meeting, or any other time, I will endeavour to ſet forth this deſign in as proper a light as poſſible I can, and I hope I can give ſatisfaction to the niceſt inquirer;

and I ſhould be exceeding fond to correſpond with ſuch a worthy ſociety as yours, but am at too great a diſtance.

I ſhall be obliged to you for an anſwer as ſoon as poſſible, that I may communicate to you my beſt method of preventing this great obſtruction, that now rages ſo deſperate in every part of this country; though ſome of my friends I have adviſed to try a method which has had the deſired effect.

From your humble ſervant.

LETTER II.

To the AGRICULTURE SOCIETY.

Gentlemen,

By the following I mean to give you my opinion the reaſon why potatoes are curled, as alſo ſome methods I have tried which may prevent that growing misfortune.

I have about a quarter of an acre of potatoes, well manured with cow and horſe dung, and took the greateſt care in picking the fine ſmooth-ſkined potatoes for ſets: Notwithſtanding all this, I believe nine out of ten parts are curled. From this I thought the fault did not lie in the potatoe; as ſuch was determined to make ſearch to the root of a curled one, which I did with the greateſt care, and a little ſhort of the root found a white grub or inſect, about half an inch long, with eight or ten legs, its head brown and hard; are very quick at hiding themſelves in the ſoil. I tried a few roots more, took four of the ſame kind, put them in a wood box with ſome damp ſoil, gave them air through the top. I have the ſtrongeſt belief that theſe inſects are the only reaſon why potatoes are curled, as upon examining a great number of that kind, found them all bit, chiefly from the ſurface to the root, which of courſe ſtops the progreſs of the ſap, and throws the leaf to a curl: The worſt curled are the moſt damaged on the ſprit. I alſo looked at a number that was free from curl, but not one that had the leaſt apparent damage; therefore I reſt ſatisfied that theſe inſects are the grievance; but at the ſame think they will be ill to deſtroy without damage to the potatoe. I have tried a few experiments, as follow: Firſt, I put ſoot to the inſects in the row for two days, but it did them no harm: After that I put lime to them for the ſame time, but they ſtill kept lively: Next I put as much ſalt as I held between my two firſt fingers, which deſtroyed them in a few hours. My opinion is, if a ſufficient quantitity of coarſe ſalt could be met with for the country, and put into the ground at the time the land is preparing for potatoes, it would effectually cure this diſtemper. Shall at any time be willing to wait on the ſociety for examination on this head, and am,

Gentlemen, your very humble ſervant.

P. S. I put ten of the ſame inſects to the ſame ſoil, and ſalt that killed the firſt five, it alſo deſtroyed them in a few hours. I found the ſame inſects at two different places, five miles diſtant from here; and have not the leaſt doubt, if you will examine, of your being of the ſame opinion with me.

LETTER III.

A conjectural *Cauſe of the* Curled Diſeaſe *in* POTATOES.

I Apprehend it will be admitted, that the above diſorder was little, if at all known, before the late improved method of growing them, by earthing the ſoil to them by the plow. If the above is admitted, it is preſumeable the cauſe proceeds from the method of cultivation: From which *I conjecture*, that it is owing to the branch ſtriking root into the new earthed-up ſoil, from which grow potatoes of ſuch a nature, as produce the year following the diſeaſe complained of. I have greater reaſon to think my above conjecture is right, as this year the potatoes I ſet were chiefly got by delving for the year laſt paſt, and I have very few curled ones amongſt them.

I am informed they have for ſome late years grown potatoes, by earthing the ſoil up to them, in the neighbourhood of *Nottingham*, and that now they begin to complain of the diſeaſe of curled ones amongſt them. It is probable that the diſorder, if got amongſt potatoes, may remain in ſome degree for a year or more, before it can be intirely eradicated, though the ſeed may be raiſed from ground digged: But if this is the caſe, the diſorder's great increaſe is very eaſily accounted for.

If I am right in the above, to prevent the diſeaſe, take your ſets from thoſe potatoes that have not bred any from the branch covered; or otherwiſe, dig that part you propoſe to raiſe your ſets from.

* * *

LETTER IV.

To Mr. JOHN PARTINGTON, *Secretary, in* Withy-grove, Mancheſter.

SIR,

I Take the liberty to claim premium the firſt, claſs the fifth, for the diſcovery of the moſt probable cauſe of the curled diſeaſe in potatoes, &c. offered by the Agriculture Society at *Mancheſter*.

My experiment leads me to think, that this diſorder proceeds from potatoes being ſet in old tilled or worn-out ground; for though thoſe potatoes may look tolerable well, and not appear to be curled, yet make ſets of thoſe potatoes and plant them, moſt, if not all, will be curled.

I have made this obſervation in ſeveral different inſtances, and am convinced that no ſets ought to be uſed from old tilled or couch-graſs land. In order to have good ſets, take care to procure them from land that was purpoſely fallowed for them, from freſh ley land, where you obſerve they are not curled, or from ley land that was burned laſt ſpring: Plant them on like virgin mould, and your potatoes will have no curled ones amongſt them: Hole them for winter from any other kind.

But it is ſo difficult to be ſure of your ſets not having come from worn-out land the year before, that I ſhould recommend potatoe crabs to be gathered from potatoes growing this year on freſh land, free from curled ones, and next ſpring ſow them on freſh ley land, and continue to plant the ſets from them on freſh ley land, yearly, and I am convinced you will not have curled potatoes.

I ſaw curled potatoes growing laſt year on bad old tilled land, and the increaſe from thoſe potatoes was planted this year on bad old tilled land: They are now plowed up, and the land ſowed with turnips.

But who is able to procure curled potatoes growing this year on fine freſh ley land, provided they had their ſets from fine freſh ley land, that was fallowed or burned laſt year? But if any curled potatoes can be procured this year from the aforeſaid land, I ſhall conclude thoſe potatoes were diſtempered in 1776, by growing in old tilled land; yet thoſe potatoes that are good may be proper for ſets.

There are different ſorts of curled potatoes, ſome badly curled, others not ſo bad: Thoſe that are badly curled, will not be recovered by planting them on fine freſh ley land; and thoſe that are but little curled, may be recovered by planting them on the afore-mentioned land.

Alſo we ſee ſome potatoes growing this year, will have one good ſtem and one curled ſtem: This is owing to the potatoe ſet having two eyes: One end of the ſet rots, and will have a good ſtem; the other end is hard, and will have a curled ſtem.

In 1776, a neighbour of mine raiſed potatoes from the ſeed of uncurled ones, planted them with his other potatoes for uſe laſt year, in old tilled worn-out land, and this ſpring planted them in a freſh broke-up paſture; and the greateſt part of them are curled.

Alſo ſeveral other perſons have ſown ſeed in old-tilled gardens, in hopes to have been free from curled ones; and wherever they have planted them next year, I have obſerved they have been curled.

I ſhall continue my obſervations, and ſhall always be ready to give any information I am able to ſo uſeful a ſociety.

Where I have ſeen good potatoes growing this year, either on freſh ley land, or on old tilled land, upon making enquiry, I have found the potatoe ſets grew upon freſh ley land laſt year: Alſo, where I have ſeen curled potatoes, I have found, upon enquiry, the potatoe ſets grew upon old tilled or worn-out land laſt year. The reaſon which appears to me, why curled potatoes are more common now than formerly, the land is oftener cropt than it had uſed to be, much more corn being raiſed in this country than formerly.

LETTER V.

THE following experiments and obſervations on the curled diſeaſe in potatoes, are humbly offered to the *Agriculture Society* at *Mancheſter*.

In 1772 I firſt obſerved the general appearance of that diſeaſe. In that year by accident I planted ſome potatoes full *nine* inches deep. When they were taken up, many were rotted, a *few* of the plants were alſo *curled;* but I kept *all* the potatoes for ſeed, to plant two ſtatute acres in 1773. Theſe were not *ſix* inches deep; the crop was amazingly great indeed, and I did *not* obſerve any curled potatoes amongſt them.

In 1774 my maſter's labourers had each of them ſome of them for ſets, and planted them in different ſoils; yet they were ſo infected with the curled diſeaſe, that not one plant in twenty eſcaped.

In 1775 the complaint of this grievance became very general.

In 1776 it occurred to me, that the good crop of 1775 was owing to the *accidental deep* ſetting of 1772, and that the reaſon why the *ſame ſeed* became ſo curled in 1774, was owing to the ebb ſetting of 1773: And from farther obſervation I do believe, that the practice of *ebb ſetting* is a principal cauſe of this diſeaſe.

In 1777 I took ſome potatoes that I knew to be taken from a curled crop the year before, and after cutting the ſets, left them in a *dry* room for a month. Half of theſe ſets were then planted in ſome ground that had been *dug* fourteen days before, and the other half alſo, having been ſteeped in a brine made of whitſters aſhes for two hours, were planted in the ſame land at the ſame time: The reſult was, that the ſteeped ones came up ten days before the others, and hardly any miſſed or were curled: The unſteeped ones generally failed coming up, and thoſe which did were moſtly curled. I therefore adviſe, as a remedy for this increaſing evil,

1ſt. That the potatoes which are intended for the *next* year's ſets, ſhould be planted *nine* inches deep.

2d. That they be not got up too early, but that they remain in the ground as long as the ſeaſon will permit.

3d. That theſe ſets be very well defended from froſts till the beginning of *March*.

4th. That the ſets be cut a fortnight before planting.

5th. That they be ſteeped as above, two hours in brine or ley.

6th. That the dung be put *over* the ſets.

I will add, that it is my advice that freſh ſets be got every year, from the ſandy ſoils on the ſea ſhore.

P. S. When the ſets have lain a fortnight after cutting, thoſe which ſeem hard and dry ſhould be caſt aſide, for they will probably be curled; and I have obſerved that the curled potatoes always proceed from ſets which do not rot or putrify in the ground.

LETTER VI.

Mr. John Partington, *Secretary to the Agriculture Society*, Mancheſter.

Sir,

I Have ſet of the old red potatoes many years; have five drills of that kind, and four of the Winter Whites, now growing in a field in *Over Peover*. The drills in which they grow were prepared exactly alike. Amongſt the red kind there is not one curled—The Winter Whites have almoſt all the curled diſeaſe. I have been very attentive to diſcover the cauſe of this diſeaſe: Have found by experience, that the red kind of potatoes were ever free from it.

LETTER VII.

To the GENTLEMEN *of the Agriculture Society.*

GENTLEMEN,

I Have made bold to ſend you a few obſervations which I have made on the curled diſeaſe.

1ſt. There are many of our neighbours who have had their potatoes for ſets bought in *Mancheſter* market: They were not of that little ſort which the farmers call ſets, but of the larger ſort, very freſh and full of ſap, but moſt of them proved curled. There are others who have ſet large potatoes whole, and they prove worſe than thoſe which were cut.

2d. Laſt year two of our neighbours had their ſets out of one heap of potatoes. They both ſet with the plough; the one ſoon, and the other late. Moſt of thoſe which were ſet ſoon proved curled; and moſt of thoſe which were ſet late proved ſmooth. I think they were both, but I am certain the latter was upon clay land.

3d. Another of our neighbours has ſet a few roods of land with little potatoes, which had lain ſpread abroad upon a chamber floor all winter, and the ſpring following, till about the middle of *May:* They were very ſoft and withered, and not much larger than an Orlean plum. If theſe had proved curled, one might have thought it was through want of ſap; but they proved ſmooth, and are likely to be a good crop.

4th. One of thoſe I mentioned firſt, who had ſet large freſh potatoes, when he ſaw how they proved, pulled them up, bought more ſets, and ſet the ſame land again: Theſe proved ſmooth.

Theſe potatoes which were ſet laſt were neither large nor freſh, but withered, and very ſoft; they were kept in a large dry cellar, and the ſprouts had been broken off three different times.

From theſe and the like obſervations, I was led to think, that the cauſe of the curl was a ſuperfluity of ſap, which I thought might be occaſioned by the ſeed being unripe.

But that I might be further ſatisfied in this, I went and enquired of the farmer, whether he had ſet of the ſame potatoes this year? He anſwered, 'I have: They have been ſet upon this farm fourteen years, and I have none curled.' I then enquired after the nature of his land? He anſwered, 'Our land is very poor; we have but a little depth of ſoil, which lies upon a whitiſh ſand.' I underſtood he was particularly careful to grow his potatoes good: 'Thoſe we deſign for keeping, (ſaid he) we let grow till they are fully ripe, and we are not yet begun to bring to the market, becauſe they will not carry their ſkins.'

From this I think we may conclude, that the only and ſure way to prevent the curl for the future, is to grow thoſe potatoes which are deſigned for ſeed, till they are fully ripe, and to keep them dry all winter; for we learn from the foregoing obſervations, that keeping them dry and diminiſhing the ſap, has no tendency to bring on the diſeaſe; and it is my opinion, that getting up potatoes unripe, keeping them freſh, and ſetting them while they are ſo, has brought on the diſeaſe; which I think has been increaſed this year by the wetneſs of the ſpring.

In a large quantity of potatoes, when there are but few ripe, there are many which may be called half-ripe: When theſe are uſed for ſets, if the ſetting and ſpringing ſeaſons prove dry, we ſtand a chance for a crop; but if wet, as it has been this year, the curl is almoſt certain.

This, I think, might be the caſe of thoſe two I mentioned, who had their ſets out of one heap of potatoes, which I ſuppoſe might be of that ſort which I call half-ripe; and I think it probable, that the ſuperfluous ſap of thoſe that were ſet the latter, was taken off by ſprouts before they were ſet, and the dryneſs of the ſoil and ſeaſon after they were ſet. But it may be aſked, Was there no unripe potatoes a dozen years ago? I anſwer, I cannot ſay there was not, neither can I ſay there were none curled at that time; becauſe there might be here and there a curled potatoe ſome years before they were much noticed: But this I can ſay, that ſetting late and reaping ſoon was not ſo common then as it is now; and theſe are the chief cauſes of unripe crops.

There has been alſo another change made in the cultivation, and that is ſetting with the plough. How far this may have conduced to bring in the diſeaſe, I cannot ſay; but whatever that method of cultivation is, which hath produced moſt large potatoes, that, I think, has conduced moſt to bring in the diſeaſe; becauſe large potatoes require a long time to ripen them; conſequently there are few large potatoes thoroughly ripe.

LETTER VIII.

To the AGRICULTURE SOCIETY.

GENTLEMEN,

I Have tried ſeveral experiments, to prevent, if poſſible, the curled diſeaſe in potatoes, but without effect; neither do I think any method can be found out, to put a ſtop to thoſe that have curled the preceding year.

I have ſet a quantity of the red potatoes, and have not had a curled one amongſt them; and I dare venture to ſay the method will be durable; which is thus. When you cut your potatoes into ſets, pick out thoſe that are the reddeſt in the inſide, and thoſe will be genuine ſets. In like manner, when you dig your potatoes up at *Michaelmas*, be very particular not to caſt any of your curled ſeed amongſt the others, which are eaſily diſtinguiſhed by their hardneſs, and alſo by the withering of the ſtalk, at leaſt two months before the others. But perſons that have been accuſtomed to ſetting quantities of potatoes, know the original ſhape and colour of every kind; and if they will but be careful in cutting their ſets from ſuch, I make no doubt but they will anſwer to the purpoſe.

As for the cauſe of the curled diſeaſe, it is owing to the potatoes which of late years have been ſet amongſt us being produced from the ſeed, inſtead of the roots, as formerly; and I am certain they will not ſtand good more than two or three years, but grow curled, uſe what method of prevention you will. The laſt ſpring I purchaſed a few of the old red, and white Ruſſets for ſets, and have not a curled potatoe amongſt them. I purpoſe for the future to ſet very few beſides the old kinds, for they are ſure to ſtand good, though not quite ſo early. I muſt not forget to mention, that upon the lime-ſtone land, in and about *Denbigh*, N. *Wales*, they have no curled potatoes. Does not this ſeem to be owing to the land there? If ſo, perhaps lime may be a proper manure to prevent the diſeaſe; but then, as I obſerved before, the ſets muſt be from the moſt genuine potatoes. This experiment I intend to try the next ſeaſon.

I have thus far given you my free thoughts and experiments, and hope I ſhall in ſome meaſure lay claim to your premium. If any farther experiments I ſhall make, ſhould lead to a diſcovery of the diſeaſe, I ſhall not be wanting to lay them before the public.

LETTER IX.

Mr. John Partington, *Secretary to the Agriculture Society*, Mancheſter.

Sir,

HAVING ſeen a premium offered by your worthy ſociety, for aſſigning the moſt probable cauſe of the curl in potatoes, I have preſumed to give in my reaſons, humbly ſubmitting them to your conſideration. But firſt I beg leave to digreſs a little.

It is the cuſtom in our town to let out fields in ſmall parcels, to be burned and ſet with potatoes, to cottagers, *&c.* which I myſelf have done three times within theſe ten or twelve years. I have likewiſe been conſtantly employed to meaſure the land ſo let in our town, for theſe laſt nineteen years. I only mention the above, to prove my having had an opportunity of ſeeing and forming my judgment on the caſe, with as much propriety as the perſons who raiſe or grow large quantities for ſale, and who frequently aſſign very odd and abſtruſe reaſons for the diſaſter, without conſulting nature in her moſt plain and ſimple rules. It is likewiſe the cuſtom with us to divide the potatoes in getting up into three ſorts, *viz.* large, or eating potatoes, ſets, and chats, or pig potatoes.—I ſhall now proceed.

Firſt then. It is moſt certain, that all ſorts of grain will wear out, and turn to wild, if ſown too long upon the ſame lands, and that the lighter you ſow your grain, and the quicker will be your decay: The ſame will hold good in regard to all ſorts of pulſe, peas, beans, *&c.* and this I conceive to hold with regard to potatoes: Likewiſe, though all ſorts may not have ſhewn their natural decay in the ſame manner, yet the ſorts in uſe at preſent, (which I take to bear a great affinity to each other) I apprehend ſhew the laſt ſtage of their degeneracy by the curled tops, and that it at firſt begun its progreſs, and has arrived at the preſent alarming height, by making uſe of too ſmall ſets; it being very viſible, that cottagers, who ſort their potatoes ſo as to fetch the beſt penny, (to this end making ſmall ſets) have been the perſons who have all along been moſt troubled with the malady. I ſhall here inſtance my own practice for theſe laſt eleven years, at which time I bought a parcel of freſh ſets of the Golden-dun kind, and have uſed them without change to this preſent year, without the leaſt appearance of the curl, which I aſcribe to the orders given to my getters-up to make good (i. e. large) ſets, and to ſort all ſcabbed or miſhapen potatoes to the chats. This, I muſt confeſs, was at firſt done without any thoughts of the phœnomena.

About four years ago I was inclined to change my ſets, thinking my potatoes worn out, from the ſigns of being too ſmooth, too round, and much diminiſhed in their increaſe; but the curl beginning to be about that time alarming, I continued my own ſets; till ſetting only a few the laſt year, and my crop miſſing, I was forced to buy my ſets this ſpring, and not at all to my ſatisfaction, and which very much ſtrengthens my opinion in regard of uſing ſmall ſets, my potatoes being this year equally curled with other people's; though I am ſtrongly inclined to believe they would have been clear as uſual, had I had the opportunity of culling my own ſets; and I am further inclined to believe, that the natural decay may prevent ſome potatoes from getting their common growth, which thereby (as we expreſs the term in apples) become ſcruts, and are ſorted for ſets, which then curl, and become equally wild and ſpurious as wild oats. I ſhall only obviate an objection or two which I think I hear going to be made, and ſo conclude, *viz.* Chats, or light oats, have been uſed without any viſible alteration: Allowed, chancely, when the ſeed is freſh, and the land ſuitable and proper; but I hope no man would recommend the practice. Secondly, that the curl has frequently happened to perſons who have made uſe of large potatoes for ſets: This I likewiſe allow; for as all roots are not equally affected, ſo ſome perſons may unwittingly ſort ſome from the curled roots into the eating potatoes, which in fact ought to have been totally deſtroyed, by ſorting all the curled roots to the chats.

To prevent the evil for the future, I ſhall recommend the two following methods: And firſt, let your ſets be gathered from a flat of potatoes, as clear of the curl as poſſible, taking a clear and middle-ſized potatoe for the ſet, by all means avoiding the curled roots: Preſerve them as uſual till the ſpring; when, if you perceive any harder, or in the cutting to graſh more than common, refuſe them as infected, and this I make no doubt will remedy the evil. Secondly, I would recommend the raiſing a freſh ſort from the crab, which I would take from ſorts the leaſt affected; ſuch with us are the Long-Duns.

I beg leave to add a few certificates to ſtrengthen my aſſertions, in regard to the uſe of ſmall ſets; from whence I conceive all the miſchief firſt ſpread abroad.

I H. S. do teſtify, that I have ſet the dun potatoes theſe laſt twelve years, without changing my ſets; that I always made uſe of large potatoes for ſets, and that my potatoes, 40 perches, are entirely free from the curl. H. S.

I O. B. do declare, that I have ſet twenty perches of land with Long Duns, conſtantly making uſe of large potatoes for ſets; and that I have only two curled roots in the ſaid flat. Witneſs my hand, O. B.

I W. A. declare, that I have planted nine perches with ſets cut from large potatoes, of the Long Dun kind, and that I have not even one curled root in the whole flat. Witneſs my hand, W. A.

I only give the above three out of many I could have produced; the leaſt of which cannot in any compariſon be equalled by any flat of land planted with common-ſized ſets in our neighbourhood.

The reaſon why farmers in general are more clear of the curl, is, they make more offal (and uſe it for their cattle) than cottagers.

LETTER X.

To Mr. JOHN PARTINGTON, Withy-grove, Mancheſter.

SIR,

THE reaſon why there are ſo many curled potatoes is this: For inſtance; take potatoes with the ſprits and break them off, then ſet them, and they will be curled ones. Again; take one that is ſprit, and ſet it with the ſprits on, and it will not be curled: Then take a potatoe which is ſprit, and cut a ſet off with two ſights, as we call them; break one ſprit off, and let the other ſtay on, and ſet it—the one will be curled, and the other will not. That which is broke off will be curled.

N. B. When you have holed your potatoes, do not let them ſtay in the hole till they are ſprit: Take them out before, and lay them dry until you have ſet or ſown them, and you will have no curled potatoes. The above has been tried and found to anſwer.

LETTER XI.

To the Members *of the* Mancheſter *Agriculture Society.*

Gentlemen,

FROM all accounts that I can gather in our neighbourhood, (the environs of *Liverpool*) curled potatoes did not make their appearance much above a dozen years ago, and then in a very ſlight degree. For the firſt two or three years they were conſidered and viewed as a curioſity, and little regarded; till the year (I think 1768) a certain farmer, who was very attentive to any thing that had the appearance of profit, judged they muſt be ſome new ſort, and very early, from their arriving at an immature ripeneſs ſooner than the reſt. Upon which grounds, he had a number of this kind ſelected out of the crop, and kept for ſeed the ſucceeding ſeaſon; which he planted, but found his error, by a very great deficiency of produce.

From this time they begun to be dreaded; and the evil ſeems to have kept increaſing yearly, without any proper attention to the cauſe, or application of a remedy, further than changing their ſets amongſt ſuch of their neighbours as they ſound had the feweſt infected. This method ſucceeded, or not, as it might happen.

I have been at the expence of procuring ſets the diſtance of fiſty miles, from a place where they knew only from hearſay that there was ſuch a diſorder. The firſt year's trial was ſucceſsful: The year after I procured ſets from the ſame place; judging it better to pay the expence of carriage, with ſome certainty of a crop, than riſque one with thoſe I then had, though clear the year before.

But this ſecond trial was not equally ſucceſsful; perhaps one fifth of the whole of that year's produce being infected.

Again, by way of experiment, I have planted ſets from thoſe roots which I knew were infected the year before, and have ſometimes from *theſe* procured healthy plants, without the leaſt appearance of infection.

From theſe circumſtances of the complaint, the cauſe ſeemed every way puzzling, as I was not certain either that I ſhould have curled potatoes from curled ſets, or that good ſeed would continue that quality another ſeaſon.

But as every effect muſt have a cauſe, and that cauſe muſt reſt ſomewhere, I gueſſed that probably it might be an inſect, which by living upon the leaves, gave them that curled or ſickly appearance, and prevented the roots from coming to their proper growth; for every body knows, that if the branches are either devoured by cattle, or cut down by an inſtrument before a certain time, the roots never arrive at their true perfection.

To ſtrengthen this conjecture, may be obſerved almoſt a ſimilar appearance among fruit trees infected by vermin, gooſberries, currants, *&c. &c.* for if ever the inſects fix upon a tree, the leaves put on this ſickly curled appearance, and the fruit of theſe trees is always of an inferior quality.

Further, and which ſeems another corroboration; ſometimes not only from *one ſet*, but from the different eyes in the *ſame ſet*, ſome of the branches are infected, and others quite healthy; and the roots adhering to the healthy branches arrive to their perfection.

But whether the inſect is lodged in the old ſet, and to be deſtroyed at the time of planting, or proceeds from ſome other external cauſe, and therefore can only be deſtroyed afterwards, is another queſtion. I have obtained very little light upon this head from the experiments I have made; but ſuch as they were I have given them, and hope for better ſucceſs in future.

I ſelected a piece of ground that had not been dug up for near twenty years, hoping by this, that the ground at leaſt was clear from infection. Upon this ground (in drills of about two feet diſtance, and the ſets about a foot from each other in the row) I planted eight rows; four rows with ſets procured from curled potatoes, and the other four rows with ſets that I knew to be perfectly clear. In each row were about twenty ſets.

LOT 1ſt. The curled ſtate.

No. 1. Without any manure.
2. In ſalt.
3. In ſoot.
4. In quick lime.

LOT 2d. The ſets quite clear the preceding year.

No. 1. Without any manure.
2. In ſalt.
3. In ſoot.
4. In quick lime.

Thoſe planted in ſalt and ſoot, in both Lot 1 and 2, were deſtroyed. Lot 1, No. 1 and 4, all curled; Lot 2, No. 1 and 4 quite clear. In this experiment I gained little or nothing. I proceeded upon a ſuppoſition that the inſect lodged in the ſet, and ought to be deſtroyed at the time of planting. I cannot with certainty as yet ſay, that it either does or does not, though moſt probably it may; the materials I made uſe of for deſtroying the vermin being either over-powerful, by deſtroying the plants No. 2 and 3, both in Lot 1 and 2; or not enough ſo, No. 4, Lot 1, yet remaining curled.

I repeated both ſalt, ſoot, and quick-lime, upon the branches of ſeveral curled potatoes. Salt deſtroyed the branches of all I touched with it. Lime and ſoot had, I thought, a partial effect upon the plants; for after ſome time they ſeemed to get the better, and appeared almoſt as healthy as the reſt.

Thus I have done nothing with certainty towards the cure; but I flatter myſelf I have pointed out the cauſe, as is pretty evident from the inſpection of the branches; the inſects upon theſe plants being not only very numerous, but even viſible to the naked eye; which I muſt own I never examined before this year.

I have only to add, if the true cauſe is diſcovered, one ſtep is gained towards the remedy. In this hope, and that you will receive this imperfect account with candour, I ſubſcribe myſelf,

September , 1778. *Yours*, &c.

LETTER XII.

Mr. Partington, *Secretary to the Agriculture Society*, Mancheſter.

Sir,

I Received your letter of the 1ſt of *September*, according to my requeſt, and am greatly obliged to you for that favour.

Now, ſir, I will firſt give my opinion, what I believe to be the moſt probable cauſe of this diſeaſe in potatoes; which I ſhall wholly aſcribe to froſt, and bad keeping in winter and ſpring before ſetting: Not but they may ſometimes receive damage by froſt after they are ſet; but this may be proved by covering To this ſome may ſay, If that is the reaſon, how did it happen that it was not ſo formerly? To which I ſhall anſwer as I did in my laſt,* That it is the neweſt kinds which are moſt apt to curl. Not only that, but there is a great many more got every year than there uſed to be, and not the due care taken there ought to be in thoſe they intend for ſeed.

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* Letter the firſt.

But to remove this great obſtruction, this is the method I adviſe, which had the deſired effect both with me and others that tried it.

I fix out the moſt convenient part or parcel of land whereon my potatoes grow, about as much as I think I ſhall require for ſeed the next year, in which ſtate I let them be ungot all winter, covering them with any kind of litter or ſtraw, ſo that the froſt does not hurt them; and I would not adviſe to get them up till juſt the time they are wanted to be ſet again; and in caſe there comes no froſt after they are ſet to hurt them, I will be bound they are free from curled ones.

Every one may not have this opportunity of preſerving their ſeed, therefore I ſhall adviſe to hog them up in the following manner. Firſt, conſider what quantity you propoſe to put into one hog; then dig a hole three graſt deep, into which put your potatoes, without any ſtraw in the bottom, and when you have as many together as you think proper, if your potatoes have been got up ſome time, and are become dry, I would ſprinkle them with a little water, then lay plenty of ſtraw on the ſides and on the top, ſo cover them up with ſoil, and preſerve them from froſt as uſual. Now if you intend theſe for ſeed, be careful not to diſturb them till the very inſtant you go to ſet them. Having your land in order, open your hog, and take out what you intend to ſet, by which time ſome may very likely be ſprit, and the ſets appear very plain, by which you may poſitively ſee they are not likely to curl; but be careful not to damage the ſprits in ſetting, and you will certainly find benefit thereby.

N. B. Gentlemen, I hope I have laid down what is likely to be the moſt probable cauſe of this general diſeaſe in potatoes, together with what I am certain will, with care, in a manner prevent it; and ſhall take it as a particular favour to hear how it is approved of by your ſociety.

September 23, 1778.

LETTER XIII.

SENTIMENTS *upon the Curled Diſeaſe among Potatoes, humbly offered to the Preſident and Vice-Preſidents of the Agriculture Society.*

IT is well known by great numbers of people now living, that, before potatoes were raiſed by the plough, digging for them with the ſpade was the method almoſt univerſally made uſe of; which work commonly commenced about the middle of *February*, if the weather permitted; and moſt of the potatoes were ſet before the end of *March*, or the firſt week in *April* at the very lateſt.

Now ſince ploughing for them has been in general uſe, we have ſeen the farmers very buſy in their potatoe laying (as they term it) the firſt week in *May*, and others, who have no teams, and muſt therefore wait 'till they can be aſſiſted, buſy in theirs as late as the middle of *May*, and many after that time.

Formerly the Red potatoe was as generally ſet as the Winter White, or *Lincolnſhire* Kidney is now. The firſt was a much later kind of potatoe than either of the two latter, and therefore did not ſprout ſo early in the ſpring. The white potatoes ſprout very early, and therefore ſhould be removed the *firſt* out of the place where they have been preſerved during the winter. Inſtead of that, they are too often let ſtay 'till they are matted, roots and ſprouts all together, ſo much that they are ſeparated with much difficulty.

After ſeparation, the firſt thing that is done is the rubbing clear off all the ſprouts, and afterwards laying them by till a further ſeaſon, 'till the ground is nearly prepared for their reception: Then you will ſee them buſy enough ſpritting a ſecond time before they cut the ſets. Pray what ſort of a ſprout will that be which comes ſecondly, or thirdly (for I have known people to ſprit them three times) from the ſame eye? Certainly it will be weak and languid, it will ſhrink and curl, ſicken and quickly die; and the fruit at the root will be ſmall and hard, ill-ſhaped and ugly, and of a diſagreeable brown colour.

Now if pulling the ſprout, once or more from the ſet before it be laid in the ground, be the cauſe (which I verily believe it will be found to be) of the curled diſeaſe among potatoes, an eaſy remedy may quickly be preſcribed. Firſt, when potatoes are got up, hole them upon a weſt aſpect as dry as poſſible: In ſuch a ſituation they will ſprout later. As to the time of removing them, ſome regard muſt be paid to the ſorts, as alſo to the weather. In my opinion, the beſt time of removing moſt ſorts out of their winter quarters, would be the firſt fine day after the 24th of *February*, and eſpecially thoſe that are to be ſet or laid: *They* ſhould as ſoon as poſſible be cut into ſets, and covered up with dry ſand 'till your land is prepared. A winter fallow, I think, is very neceſſary for your crop: It will not only greatly meliorate the land, and kill the ſeeds and hand-weeds, but your work will be greatly forwarded thereby in the ſpring. Laſtly, when you come to lay the ſets, take the utmoſt care of breaking off the ſprout, becauſe the ſecond coming from the ſame eye will not be ſo vigorous. *This* accounts for one ſprout out of three being curled out of the ſame ſet. The two ſtems that were not curled, proceeded from two later eyes; theſe were the firſt ſprouts: The ſprout of the curled one, I preſume, had been rubbed off once or oftener: Wherefore my opinion is, that, to prevent curled potatoes, the ſet with its firſt ſprout ſhould be carefully ſet or laid in the ground; and then, I doubt not, but we ſhall have our potatoes as clear and hearty as in former days.

GENTLEMEN,

The following experiment I humbly offer to your conſideration, which, if you pleaſe, may be made in your gardens.

Take, about the firſt week in *April*, twelve ſprouts from the eyes of twelve different potatoes; and as ſoon as poſſible lay them in a trench prepared with manure, at ſeven inches diſtance from each other, and gently cover them. Then, at a proper diſtance in a parallel trench, lay the twelve ſets with thoſe eyes only from whence the ſprouts were taken, and cover them as the other. I believe at the time of getting up, a weightier and better crop will ariſe from the ſprouts than the ſets. Again, take the ſame number of ſets from the ſame number of potatoes, which have had the ſprout twice plucked from the eye, and lay them in a third parallel line with the other, and I doubt not but that in two months time, or leſs, you will be convinced how brocaly-leaved, or curled potatoes, are and have been propagated.

October 17, 1778.

LETTER XIV.

To the GENTLEMEN *of the Agriculture Society at* Mancheſter.

YOUR kind offer to the public induces me to put in a claim for a premium offered by you, for the cure of a diſorder amongſt potatoes, commonly called curled ones.

It is to be wiſhed that every farmer and grower of potatoes, would at this ſeaſon of the year let the potatoes they intend for ſeed next year, grow till they are full ripe. I have obſerved, that of late years, great part of the potatoes have been ſet or ſown late, and are puſhed in the ſummer, and grow faſt, and will be often large; and in ſome of the largeſt may be found hollow cavities, as they have not time to grow ſolid, and being got up before they are thoroughly ripe, in order often to ſow the land with wheat, may be the chief cauſe, if not the whole, of there being ſo many curled potatoes.

As a proof of the above, laſt ſpring a neighbour of mine, who ſets a conſiderable quantity every year, bought ſome loads of the largeſt potatoes he could find: He cut and ſet them, in the uſual way of drilling, and they were more than one half of them curled. He was a few ſets ſhort of ſetting the land he had prepared for that purpoſe; and having ſome very little potatoes that he had laid by for the pigs, which I ſuppoſe had grown till they were full ripe and ſolid, he ſet his land out with them, and there was not one curled potatoe among them all.

Another neighbour ſet the ſame land with potatoes this year, that he ſet with potatoes laſt year: Thoſe that were ſet this year, as they came up in the rows, were the greateſt part of them curled; many came up from whole potatoes that were left in the ground the year before, and not one curled potatoe amongſt them.

I ſuppoſe the reaſon is, that potatoes left in the ground all winter, chiefly thoſe that lie deep which the froſt does not reach, are never expoſed to the open air to be dried; and though they are broke from the root at the time of getting, they are kept open, and in the ſame ſtate they were in before they were got from the root. It is well known, that a potatoe, or any other root, being got out of the ground before it is ripe, and expoſed in the open air, it will criſp, and cannot be expected to be good ſeed.

September 26, 1778.

LETTER XV.

Mr. JOHN PARTINGTON, Mancheſter.

SIR,

I Have read in the *Cheſter* paper your premium is not adjudged, for finding out the cauſe or diſeaſe of curled potatoes, although you have various ingenious and plauſible reaſons aſſigned for it by different authors; but that they almoſt all agree in ſuppoſing, that the too early taking up of the potatoes which are intended for the next year's ſets, is one very principal cauſe of this alarming evil.

In anſwer to the gentlemen all agreeing, that taking up the potatoes too ſoon for the next year's ſets to be a principal reaſon, is this. I have let ſome remain in the ground all winter, and have let ſome vegetate the following year where they grew the former, and ſome have come up curled, and ſome have not, in the like manner as the ſame ſets proved that I took up in the earlier ſtate; ſo that this cannot be a principal cauſe.

Whoever hits upon a remedy, deſerves ſix times the premium offered by your honourable ſociety. If it's a fair queſtion, ſhould like to have the heads of the reaſons aſſigned to your ſociety? for I have tried many experiments, and made many obſervations, but all have proved ineffectual to be aſſigned as a principal cauſe. If you pleaſe to oblige me, will return you the experiments I have tried, and what I have not proved, where I meet with nothing ſimilar, which may perhaps furniſh you with ſome reaſons for a detection, if any offer to impoſe.

The uſefulneſs of this root is every year more known, and am ſorry to find it is ſo much upon the decline in the encouragement to the farmer; for a miſſing crop is a great loſs, and fills the ground full of weeds and dirt. The old ſort of White-Rough, and the old Kidney Potatoe, are as ſubject to this dire diſeaſe as any other; but I find red potatoes, almoſt of any kind, are not ſo ſubject as the whiter ſorts.

October 18, 1778.

LETTER XVI.

To the MEMBERS *of the* Mancheſter *Agriculture Society.*

GENTLEMEN,

BEING a great peruſer of advertiſements, I have often found amongſt them ſeveral from the Agriculture Society, particularly one, which promiſed a premium for any perſon, that could find out the moſt likely cauſe of the reaſon of curled potatoes.

As I have been a ſufferer by the cauſe, I have taken ſome pains to find out the means by which this growing evil might be rooted out; and I think that I have not altogether been unprofitable. The reaſons I ſhall offer to your ſociety are theſe following.

People of late years have made many great improvements in their manner of ſetting potatoes, as well as in cutting their ſets. They dreſs their ground much cleaner, and dung it much ſtronger. Many people uſed to drill their potatoes, and by that means wrap up the ſeed intirely in the dung, by which means they have many more, and much larger potatoes, and I believe a great many curled ones too. Again, they cut their ſets out of the richeſt and largeſt of their potatoes, which I believe to be another cauſe of this evil. For inſtance, if you will go into cold countries at the moor-ends, as I have done, for inſpection, you will find, that if they ſet their own ſeed which has grown upon poor land with leſs dung, and not ſo rich in quantity, though as good in quality, they have no ſuch thing as curled ones; but on the contrary, when they have come to the market, and bought rich and large potatoes for ſeed, they have had great quantities of curled ones: And I am perſuaded, if they would take ſeed out of thoſe potatoes when they have grown them a year, and reduced the richneſs of their nature, they would produce no curled ones. Thus I believe, that the richneſs and largeneſs of the ſeed is the reaſon of the curled potatoes, for I do not remember I ever ſaw a curled ſtem, which did not proceed from a ſet out of a large potatoe.

I could wiſh that farmers who have rich ground, would chuſe ſeed from poor barren ground at the moor-ends: Thus they would ſee whether my opinion is right.

October 19, 1778.

LETTER XVII.

—— Bayley, *Eſq;* Hope, *near* Mancheſter.

Sir,

PURSUANT to an advertiſement in the news-paper, offering a reward for any perſon who would define the cauſe, and point out a cure for the defect in potatoes, now ſo univerſally complained of: Alſo a requeſt to any one who thought proper to communicate ſuch hints, as they thought might tend towards the diſcovery of the ſame, I make bold to lay the following obſervations before you, being informed that you are a Member of the Agriculture Society. Whether the ſubſequent will deſerve to be claſſed under either of the fore-mentioned denominations, I humbly ſubmit to you and ſuture obſervers to judge. Every error and imperfection, of what kind or nature ſoever, I hope in theſe mean attempts you'll readily excuſe.

Whoever has accurately made obſervation on the curled potatoes, as they are commonly called, I think will allow the defect or cauſe (whatever it may be) lies in the Planta Seminalis, or ſeed plant: And from a comparative view betwixt the curled ones and the other, it appears to be a want of, or inability in, the powers of expanding, unraveling, or unfolding its every part; ſo that being defective in this power, it forms a plant in that ſhriveled or ſtarved curled ſtate in which we find them. This being allowed, let us next proceed to aſſign a reaſon for this inability or defect, and ſhew wherein it lies; and alſo endeavour to point out ſome method in order to remedy the ſame.

Upon examining ſome of the ſets at the time of getting the potatoes, I found them hard and undecayed; ſo hard, that even a long boiling of them would not ſoften them. This leads me to think, ſome particular kinds of manure might have the ſame effect upon them, as tanners ooze has upon leather, and thereby harden them ſo, that the embryo plant could not come forth with eaſe, which it requires: But a ſtricter examination taught that was not the caſe, they growing promiſcuouſly in all kinds of manure.

My next ſuppoſition was, that ſome kind of inſects might be contained in thoſe warts, which burrowed into the potatoe, ſo as to injure or impair the young plant. Whether any inſects do exiſt in the warts, for want of a proper glaſs I could not determine; nevertheleſs, if they do, I have reaſon to think their reſidence is ſo ſuperficial as not to be the cauſe. Others told me their opinion was, that too great quantities were laid together, ſo as to leave a fermentation, which might occaſion it; and by ſetting the embryo plant a vegetating, and then ſtopping, might retard its further progreſs. But this I know to be erroneous, having ſeen an inſtance, wherein a ſingle potatoe was preſerved by itſelf, which, when ſet, produced of the curled kind. The laſt, and I think moſt conſiſtent and rational opinion I ſhall lay before you, is, that it is occaſioned by the potatoes being taken from the ground, before the Stamen, or miniature plant, is properly matured and ripened. In defence of which give me leave to obſerve,

1ſt. That nature produces every ſpecies of plants, in ſome parts of the world, unaſſiſted by cultivation.

2dly. That the potatoe is not a native of our country, but of a warmer.

3dly. That in all our improvements in Agriculture, we ought to ſtudy and aſſiſt nature, not oppoſe her.

4thly. That there are two ſtates of vegetation belonging to plants, *viz.* firſtly, in their embryo or fœtal ſtate; and ſecondly, in that ſtate of vegetation in which they become mature plants.

5thly. That the embryo or fœtal ſtate of vegetation is progreſſive, as well as the other.

6thly. That this ſtate of vegetation requires a certain degree of maturity, in order to qualify the Stamen or ſeed-plant properly, to perform the next ſtage of vegetation.

7thly. That it is not improbable, but if they be taken out of the ground ſome degree ſhort of that natural and full maturity requiſite to make a fair healthy root or plant, they may perform a ſort of vegetation, but in an inferior manner, from thoſe ſeed-plants fully matured in the lap of nature.

The potatoe, therefore, growing in a ſtate of nature in a warmer climate, has more ſun, and a longer continuance in the ground, than in its preſent exoſtic ſtate; conſequently, it has not thoſe natural cauſes here to mature the ſeed-plant as in its native ſtate. May we not from hence conclude, that we ought to give them all the opportunity our climate will admit, in order that Nature may compleat her work, and fit the Stamen for the next ſtage of vegetation, eſpecially ſuch as we deſign for ſeed; and in ſo doing, Nature has the extra-advantage of our manuring the ground, *&c. &c.* which is an aſſiſtance, not a counteracting of her operations. May not we reaſonably ſuppoſe, from the ſixth and ſeventh obſervations, that if the potatoe be taken from the ground before the Stamen or ſeed-plant is fully matured, that the air and ſap-veſſels not being, nor having acquired a proper degree of firmneſs or hardneſs, when robbed of all further nutrition muſt ſhrivel up. And theſe veſſels in this immature imperfect ſtate, when they come to act again in the ſecond ſtage of vegetation, may produce that ſhriveled ſtarved curled plant, which we ſee is become ſo very common.

Objection 1ſt. Why are they more common now than formerly?

Obj. 2d. Why does ~~not~~ one and the ſame potatoe produce both curled and the other kind?

In anſwer to the firſt, I am informed that people, in order to keep them long in the ground and preſerve them from froſt, covered them with ſtraw, *&c.* This, I am told, was very common in our neighbourhood, before the preſent method of ſetting them.

In anſwer to the ſecond objection, we ſuppoſe that every ſprout hole contains a Planta Seminalis; that all theſe embryo or ſeed-plants contained in one and the ſame potatoe, are all fed and nouriſhed by one procurer or root; that it is not inconſiſtent to ſuppoſe, that ſome of thoſe ſeed plants may be nurtured before others, as we ſee in ears of corn, *&c.* Further; upon enquiry (to corroborate the foregoing) I find that our moſt negligent farmers, that let their potatoes grow longeſt, are leaſt addicted to this defect: That thoſe ſets, in common, which we have from about *Stockport*, where they get them early in order to ſow the land with wheat, are more addicted to it than our own: That a neighbour of ours, about two miles diſtant, laſt year ſet two rows of potatoes, which all proved curled: He, not thinking them worth his obſervation, never got them up; and this year there are no curled ones to be ſeen amongſt them. May we not, therefore, reaſonably conclude, that if this be the cauſe, ſuch potatoes (at leaſt) as we deſign for ſeed, ought to be preſerved as long in the ground as poſſible? And in order to prove the certainty of it, I would adviſe all ſuch farmers, when convenience may ſuit, to try the experiment. If it anſwers the purpoſe they will have no reaſon to complain: If not, the loſs accruing from ſuch trial cannot be great.

Hurry in writing, and being ſtinted in time, hinders me from digeſting the above in a proper manner. If you think there is any thing contained worthy of notice, it is at your ſervice to do what you pleaſe with; or, if you think proper to have it reviſed and corrected, pleaſe to return it, and at ſome leiſure hour it ſhall be done. Relying upon your generoſity to excuſe my imperfections,

I am, Sir, your moſt obedient.

October 5, 1778.

LETTER XVIII.

To prevent the CURL *in* POTATOES.

TAKE moſs ſets, that is, ſuch as grow upon moſs land, and there will not be a ſingle curled one the firſt year. This is affirmed by all the inhabitants of *Scariſbrick* and *Halſal*, two townſhips where they grow amazing quantities of potatoes. It has been mentioned to a gentleman of the medical tribe, who ſaid he believed it was a fact; for he ſowed laſt year two buſhels of ſets from one of the above places, and had not one curled one; but on ſowing them again this year he had a few.

Nov. 16, 1778.

LETTER

LETTER XIX.

Friend Partington,

OBSERVING in your late premiums, one to the perſon who ſhall diſcover the cauſe of the curled diſeaſe in potatoes, I take the liberty of adding the following remarks, not with any view to *obtaining* that premium, but merely from a wiſh to give you any information in my power that may be uſeful.

I have cultivated potatoes many years, and from the moſt accurate obſervation have reaſon to believe, that this diſeaſe proceeds *only* from planting the *ſame kind* in the *ſame ſoil* for two, three, or more years together. Whenever I have done this, they have always become *curled*, and the roots *cankered* and *worm-eaten*. This may perhaps be eaſily accounted for.

Every ſpecies of plants is furniſhed by Nature, with pores of ſuch conſtruction and magnitude, as are capable of receiving thoſe particles of nouriſhment *only*, whoſe dimenſions and form are correſpondent to the ſaid pores. Hence it follows, that every ſpecies muſt receive or imbibe the above-ſaid particles only, and reject all others; and conſequently, if the ſame ſpecies be planted or ſown on the ſame ſoil for three or four years together, the ſoil will be exhauſted of thoſe particles which are their proper nouriſhment.

I have always found potatoes ſucceed beſt when cultivated in the following manner.

On a light ſandy loam, manured with rotten dung. The ſpecies, or the land to be changed every year.

The ſeed or ſets ſhould lie one inch, or more, above the dung.

If whole ones are planted, let them be at the diſtance of three feet ſquare, earthed up ſeveral times.

If cuts, at eighteen inches ſquare.

Dec. 13, 1778.

THE END.

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